

In the Claims

1. (previously presented) A process for the preparation of a polymeric alkoxyamine by atom transfer radical addition polymerization (ATRA) comprising the steps

- a) reacting a mono nitroxide of formula (A) $X-Ln-NO\bullet$ (A); or
- b) reacting a bis nitroxide of formula (B) $\bullet ON-Ln-NO\bullet$ (B) with a bis-functional compound of formula (C) $X-Lh-X$ (C); or
- c) reacting a polynitroxide of formula (D) $Ln-[NO\bullet]_n$ (D) with a poly-functional compound of formula (E) $Lh-[X]_n$ (E);

in the presence of a transition metal or transition metal salt in its lower oxidation state and optionally a ligand, capable of complexing the transition metal or transition metal salt;

wherein

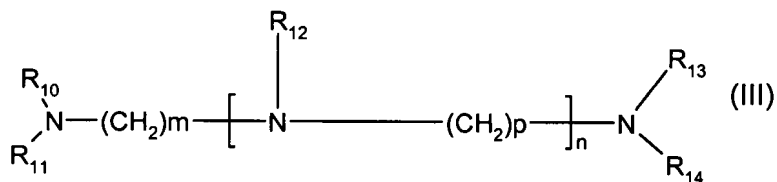
X is halogen or -SCN;

Ln is a n valent spacer group connecting the nitroxide group with the group X or with the other nitroxide groups;

Lh is a n valent spacer group connecting the groups X and

n is a number from 3 to 6.

2. (currently amended) A process according to claim 1 wherein the ligand is present and is of formula III



wherein R_{10} , R_{11} , R_{13} and R_{14} are independently H, C_1 - C_{12} alkyl, C_5 - C_{12} cycloalkyl or aryl;

R_{12} is H, C_1 - C_{12} alkyl, C_5 - C_{12} cycloalkyl or aryl or a group $-(CH_2)_q-NR_{10}R_{11}$;

m, p and q are numbers from 1-4; and

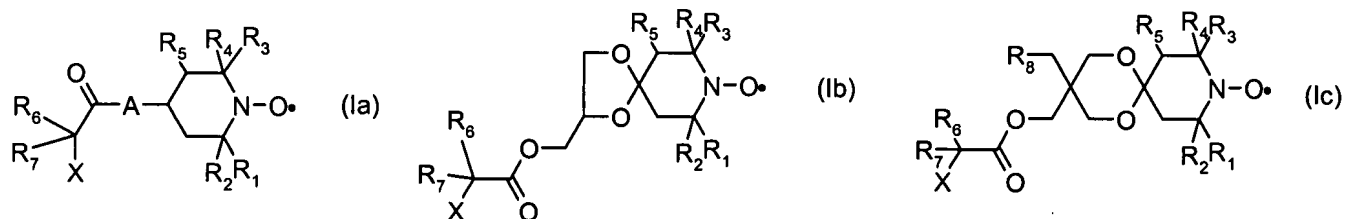
n is a number from 0 to 4; or

the ligand is a bicyclic or polycyclic heteroaliphatic ring.

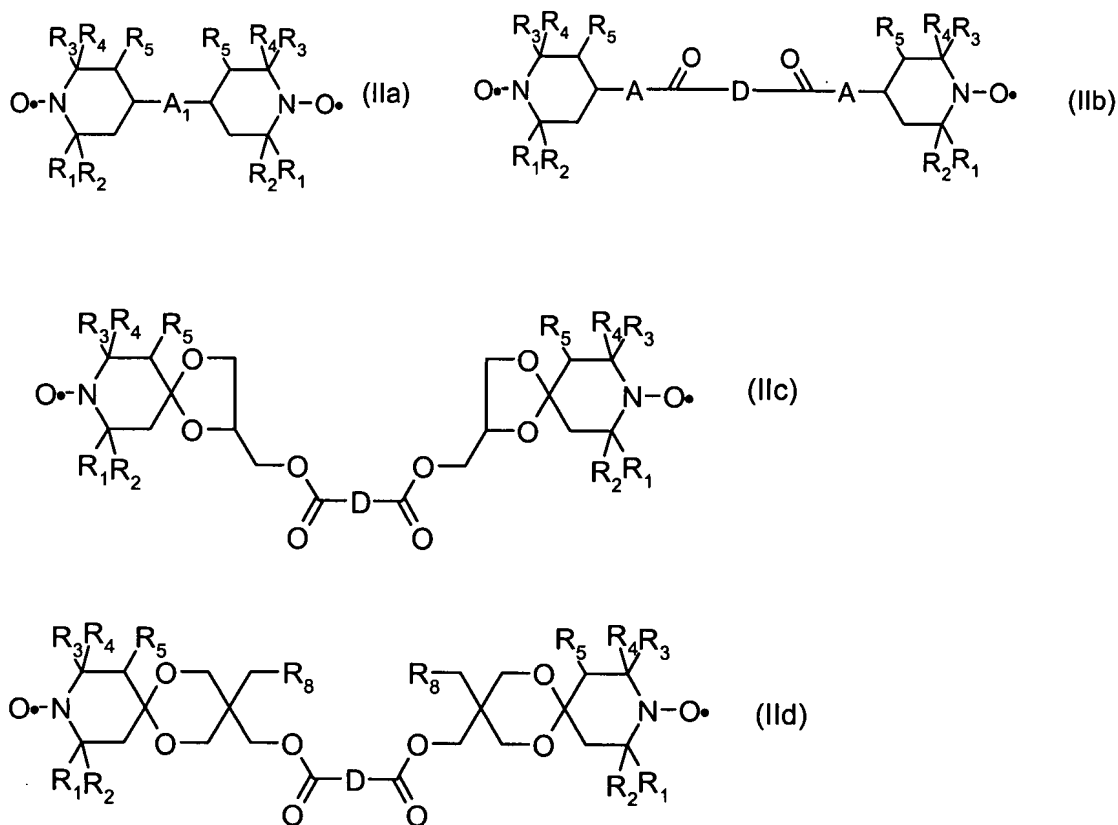
- 3. (currently amended)** A process according to claim 1 wherein the ligand is present and is selected from the group consisting of tris[2-(dimethylamino)ethyl]amine, N,N,N',N',N''-pentamethyldiethylenetriamine, N,N,N',N'-tetramethylethylenediamine, 1,1,4,7,10,10-hexamethyltriethylenetetramine, 1,4,7-trimethyl-1,4,7-triazacyclononane, 1,5,9-trimethyl-1,5,9-triazacyclododecane, 1,4,8,11-etramethyl-1,4,8,11-tetraazacyclotetradecane, 2,2'-bipyridyl, 2,2'-bi(4-*t*-butyl)pyridyl and 2,2',2''-terpyridyl.
- 4. (original)** A process according to claim 1 wherein the molar ratio between the transition metal or transition metal salt in its lower oxidation state and the halogen or $-SCN$ containing compound is from 1:1 to 1:3.
- 5. (original)** A process according to claim 1 wherein the transition metal is selected from the group consisting of Cu, Fe, Mn, Mo, Cr, Ni and Ru and the transition metal salt in its lower oxidation state is a halogenide, sulfate, nitrate, carboxylate or trifluormethane sulfonate of these metals.
- 6. (currently amended)** A process according to claim 1 wherein the ligand is present and the molar ratio between the ligand and the transition metal or transition metal salt in its lower oxidation state is from 0.5:1 to 1:5.
- 7. (original)** A process according to claim 1 wherein the polymerization temperature is from $-20^{\circ}C$ to $100^{\circ}C$.

8. (currently amended) A process according to claim 1 wherein

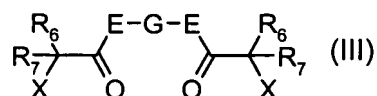
a) the mono nitroxide of formula (A) is of formula (Ia), (Ib) or (Ic),



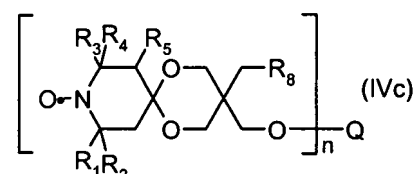
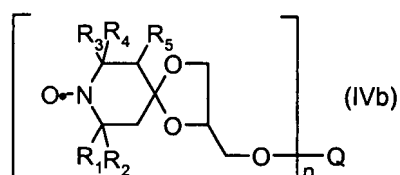
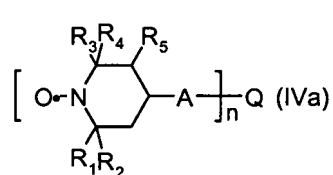
b) the bis nitroxide of formula (B) is of formula (IIa), (IIb), (IIc) or (IId),



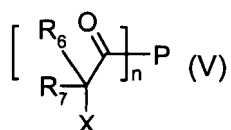
the compound of formula (C) is of formula (III),



c) the polynitroxide of formula D is of formula (IVa), (IVb) or (IVc) and



the compound of formula (E) is of formula (V)



wherein

R_1 , R_2 , R_3 and R_4 are methyl or ethyl; or

R_1 and R_2 and/or R_3 and R_4 together with the carbon atom to which they are bonded form a C_5 - C_8 cycloalkyl ring;

R_5 is H or methyl;

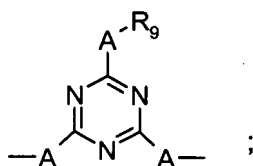
R_6 and R_7 are H, C_1 - C_8 -alkyl or aryl;

R_8 is H or methyl;

X is halogen or $-SCN$;

A is O or NR_9 wherein R_9 is H or C_1 - C_{18} alkyl, C_5 - C_{12} cycloalkyl or aryl;

A_1 is a group $-NR_9-(CH_2)_a-NR_9-$ wherein a is a number from 2 to 12 or a group



D is a direct bond or C₁-C₁₂alkylene, C₅-C₁₂cycloalkylene or arylene, wherein the alkylene and cycloalkylene may be interrupted by one or more O, S or N atoms;

E is a direct bond, O or NR₉;

G is C₁-C₁₂alkylene, C₅-C₁₂cycloalkylene or arylene wherein the alkylene and cycloalkylene may be interrupted by one or more O, S or N atoms;

n is 3 or 4;

Q is the acyl residue of a trivalent or tetravalent carboxylic acid; and

P is the residue of a trivalent or tetravalent alcohol.

9. (previously presented) A process according to claim 8 comprising reacting a mono nitroxide of formula (Ia), (Ib) or (Ic).

10. (previously presented) A process according to claim 9 where in the compounds of formula (Ia), (Ib) or (Ic);

R₁, R₂, R₃ and R₄ are methyl;

R₅ is H;

R₆ and R₇ are independently H or methyl;

R₈ is H or methyl;

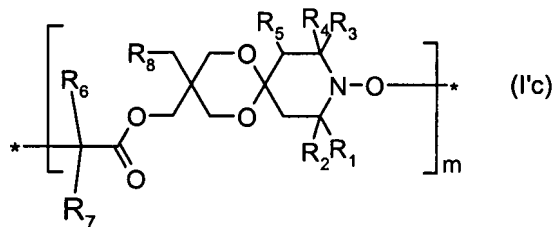
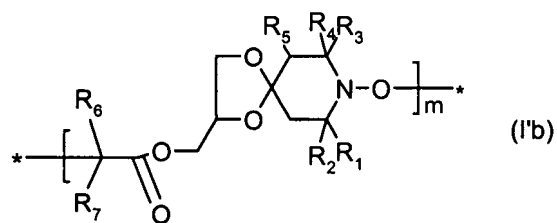
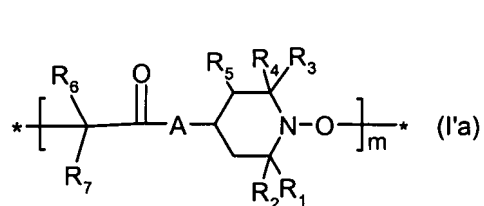
X is Cl or Br; and

A is O or NR₉ and R₉ is H or C₁-C₁₈alkyl.

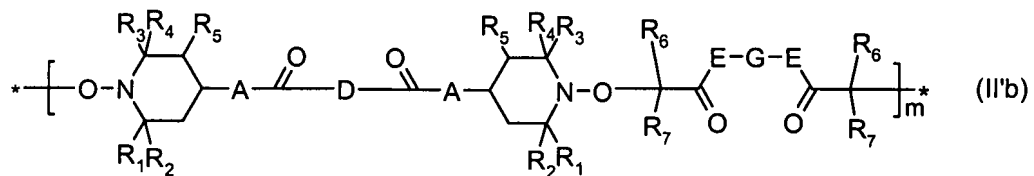
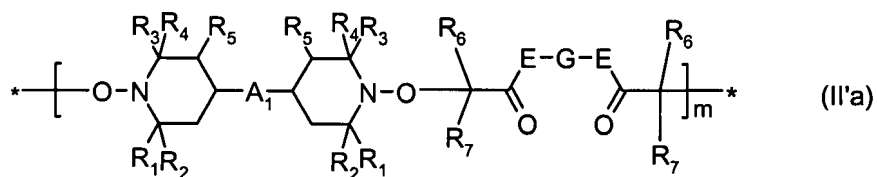
11. (previously presented) A process according to claim 10 comprising reacting a mono nitroxide of formula (Ia).

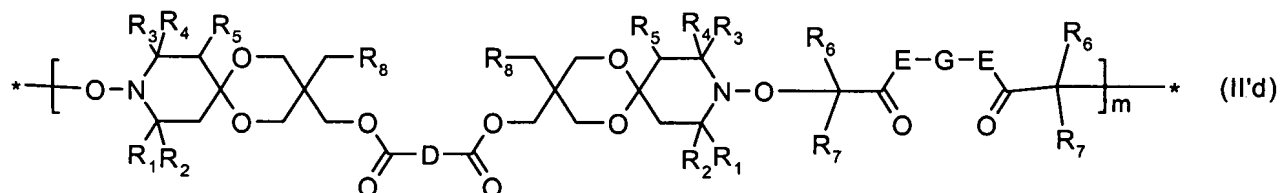
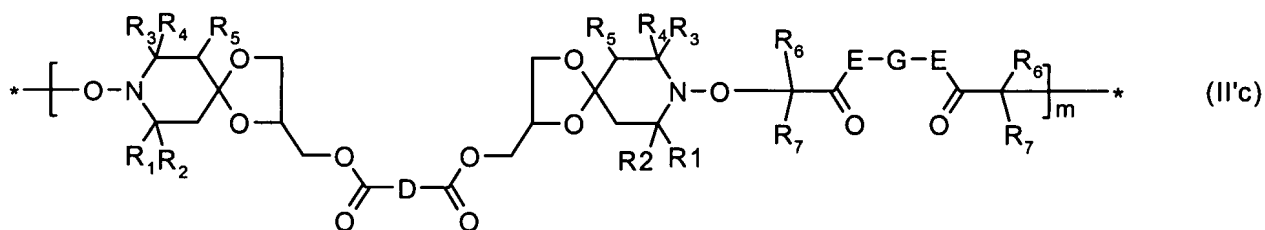
12. (previously presented) A polymer obtained by a process according to claim 1.

13. (previously presented) A polymer with a repetitive structural element of formula (I'a), (I'b), (I'c)



or (II'a), (II'b), (II'c) or (II'd)





wherein

m is a number from 1 to 5000;

R₁, R₂, R₃ and R₄ are methyl or ethyl; or

R₁ and R₂ and/or R₃ and R₄ together with the carbon atom to which they are bonded form a C₅-C₈cycloalkyl ring:

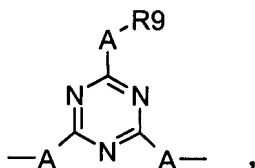
R₅ is H or methyl;

R₆ and R₇ are H, C₁-C₈-alkyl or aryl;

R₈ is H or methyl;

A is O or NR₉ wherein R₉ is H or C₁-C₁₈alkyl, C₅-C₁₂cycloalkyl or aryl;

A₁ is a group -NR₉-(CH₂)_a-NR₉- wherein a is a number from 2 to 12 or a group

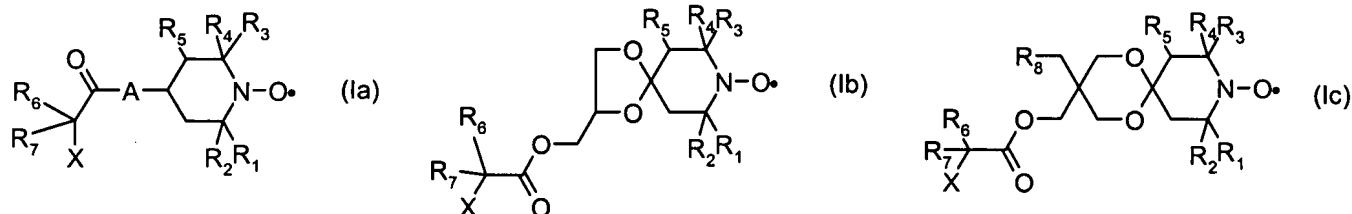


D is a direct bond or C₁-C₁₂alkylene, C₅-C₁₂cycloalkylene or arylene, wherein the alkylene and cycloalkylene may be interrupted by one or more O, S or N atoms;

E is a direct bond, O or NR₉; and

G is C₁-C₁₂alkylene, C₅-C₁₂cycloalkylene or arylene wherein the alkylene and cycloalkylene may be interrupted by one or more O, S or N atoms.

14. (previously presented) A compound of formulae (Ia), (Ib) or (Ic)



wherein

R₁, R₂, R₃ and R₄ are methyl or ethyl; or

R₁ and R₂ and/or R₃ and R₄ together with the carbon atom to which they are bonded form a C₅-C₈cycloalkyl ring;

R₅ is H or methyl;

R₆ and R₇ are H, C₁-C₈-alkyl or aryl;

R₈ is H or methyl;

X is halogen or -SCN; and

A is O or NR₉ wherein R₉ is H or C₁-C₁₈alkyl, C₅-C₁₂cycloalkyl or aryl.

15. (currently amended) A stabilized composition which comprises

an organic material subject to degradation by heat, light or oxygen and

a polymeric alkoxyamine compound obtained by a process according to claim 1.

16. (previously presented) A composition according to claim 15 wherein the organic material is a natural or synthetic polymer.

17. (currently amended) A composition which comprises

an organic material subject to degradation by heat, light or oxygen,

a polymeric alkoxyamine~~compound~~ obtained by a process according to claim 1 and

at least one coadditive stabilizer selected from the group consisting of the phenolic antioxidants, metal stearates, metal oxides, organophosphorus compounds, furanone antioxidants, hydroxylamines, UV absorbers, hindered amine stabilizers different from that obtained according to the process of claim 1 and mixtures thereof.

18-20. (canceled)